NTSC

BETACAM SP™

BVW-D75

Betacam SP Studio Recorder/Player with 4:2:2 Serial Digital Interface

Sony Broadcast

SONY

Sony, as a major manufacturer of broadcast equipment, has been leading the development of serial digital interfacing, which combines the benefits of digital signal quality with simplicity of distribution. With many innovations being introduced into the digital domain, there has been a growing demand for the integration of the world standard Betacam SP™ format into digital systems.
The new BVW-D75 Betacam SP Recorder/Player is the ultimate answer to this market requirement. The BVW-D75 has been designed as a VTR that is fully compatible with the serial digital transmission system by featuring a component digital audio/video serial interface. This allows the BVW-D75 to be fully integrated with Sony DVS A/V series digital routing switchers and the digital post production system, including the Sony DVR-2100/2000 Digital Component VTR, DVS-8000C Digital Component Switcher, DME-5000 Digital Multi Effects System, DMX-E3000 Digital Video Sound Processor and a wide range of interface units.

The BVW-D75 is a powerful new tool to complement the growth of serial digital networks in the broadcast and post production environments.

Features

Digital Interface Capability

• Video

One component digital video serial input (with active loop-through) and four component digital video serial outputs are available, each of which handles 4:2:2 component digital video signals. Four channels of digitized audio, along with the digital video signal, can be transmitted on one single co-axial cable. This greatly simplifies system connections and enables long distance transmission of digital video and audio signals without signal degradation.

• Audio

In addition to the four digital audio channels being interfaced via the single BNC of the serial digital connection, they can also be connected in AES/EBU format via XLR connectors. This enables a wide variety of professional digital audio products to be interfaced with the BVW-D75.

Analog Interface Capability

• Video

A component analog monitor output (Y/R-Y/B-Y, three BNC's) is provided. This output can have characters showing time code data, for example, superimposed.

• Audio

As well as its digital audio interfaces, the BVW-D75 also provides conventional analog audio connections. Two XLR audio monitor output (SELECTED) connectors are included for monitoring the four audio channels.

Superior Picture Quality

By combinding the Betacam SP (Superior Performance) recording format with metal particle tape, the excellent performance of the BVW-D75 produces very high quality recordings with wide luminance bandwidth, improved signal-to-noise ratio and other key parameters. With the BVW-D75, the superior picture quality of the BVW series is transmitted in the 4:2:2 serial digital component domain without any picture degradation.

Long Recording and Playback Time

The BVW-D75 accepts both L-size and S-size cassettes, giving operating times of over 90 minutes and over 30 minutes respectively.
Sony offers BCT-5M/10M/20M/30M Betacam SP videocassettes in the S-size range and BCT-5ML/10ML/20ML/30ML/60ML/90ML videocassettes in the L-size range.

Multi Audio Tracks

In addition to two conventional longitudinal audio tracks, two AFM audio tracks are also included to make a total of four channels. The two longitudinal audio channels are fitted with the type-C Dolby NR (Noise Reduction) system. The FM modulated audio is simultaneously recorded with the video information by the rotary video heads and the superior characteristics of these AFM channels, such as wide dynamic range, provide significant flexibility in broadcast applications.

Dynamic Tracking Playback

Using a Dynamic Tracking™ (DT) head and associated circuit technology, the BVW-D75 reproduces low noise, broadcast quality, video over the range −1 to +3 times normal speed. The DT playback speed can be varied in 54 steps with the search dial. Newly developed IC's have allowed the introduction of sophisticated Y-add circuitry which minimises vertical jitter within the DT range.

Built-in Editing Facility

The BVW-D75 includes a built-in editing facility to expand its system flexibility and versatility into the digital domain. In addition to insert and assemble edit functions, which are equipped with auto preview/review, the BVW-D75 also provides an audio split editing capability with independent IN and OUT memories.
The BVW-D75 meets the requirements of modern editing system with frame-by-frame forward or reverse trim, selectable pre-roll time, and auto edit in/out functions delivering frame accurate editing without any additional control hardware. Furthermore, the BVW-D75 provides a DMC (Dynamic Motion Control) editing function, memorizing the tape speed trajectory of the player VTR over the DT speed range (−1 to +3 times normal speed). The DMC edit function can then be executed.

High Speed Picture Search

The picture search facility in the BVW-D75 provides recognisable color picture at up to 10 times play speed in both forward and reverse, and monochrome pictures at up to 35 times play speed. In jog mode, tape movement accurately follows the rotation of the search dial in both directions at up to normal play speed.

Versatile System Interface

• RS-422 serial interface

An RS-422 serial interface is provided for versatile editing system expansion and flexible system control. The BVW-D75 will interface with other RS-422 equipped Sony machines.

• 36-pin parallel interface

36-pin parallel interface is also provided for simple remote control applications.

Program Play Mode

The program play mode allows video recordings to be reproduced at up to ±20% of normal play speed in 0.1% steps allowing program material to be expanded or compressed to fit a particular time slot.

Capstan Override

For manual synchronisation during playback, the tape speed can be varied in 1% step up to ±20% with the search dial or up to ±8% by using the TRIM buttons.

Selectable Reference Input

The reference source for the TBC is selectable between the analog video signal supplied to the REF VIDEO INPUT connector or the 4:2:2 serial digital signal fed to the serial video input connector. In the former case, an analog composite video signal or the luminance (Y) signal of an analog component signal can be used.

Initial Setup

For various customized operations, the BVW-D75 has three programmable setup menus with easy accessibility and simple operation. These menus allow many operational parameters to be setup to assist the operator. The setup index can be superimposed on a monitor connected to MONITOR OUT and this index can be scrolled through using the search dial. The selected

menu page can then be displayed on the monitor and modified as required. The modified menu is memorized in non-volatile memory.

Audio/Video Confidence Playback

The BVW-D75 is equipped with video and Ch-1/2 audio confidence heads for simultaneous playback during recording.

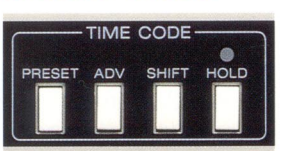
Built-in TBC

A standard broadcast video output can be obtained directly from the BVW-D75 with no additional time base correction required. The adoption of a 3-line digital dropout compensator also ensures consistent picture performance.

TBC Remote Control

In addition to built-in controls for TBC adjustment, remote adjustments may be performed with an optional BVR-50 connected via a D-sub 15-pin cable to the rear panel connector (TBC REMOTE). Parameters such as video level, chroma level, setup, Y/C delay and system sync phase can be controlled.

Built-in Time Code Generator/Reader



The generation and reading of SMPTE format VITC and LTC and user bits comes as standard in the BVW-D75. LTC can be automatically recorded on the dedicated time code track and VITC recorded in the Vertical blanking interval of the video signal. Time code or user bit settings can be easily executed using the push buttons located on the control panel. User bit settings can be pre-set and stored in non-volatile memory. External/internal time code, REGEN/PRESET, or REC-RUN/FREE-RUN selections are available.

Character Display

The BVW-D75 is provided with a built-in character generator and its output can be superimposed on the MONITOR OUT signal to display either time code generator/reader data (VITC/LTC/U-BIT) or CTL timer data. VTR function status, including shuttle tape speed, can be displayed by accessing the setup menu. When the BVW-D75 is operated under the setup menu mode, the setup menu index is automatically displayed from the character generator. In addition, malfunctions are automatically checked and the corresponding error number is shown on the time counter display.

Audio System

• Audio input select

The BVW-D75 can accept audio inputs in any one of three formats; embedded digital audio in the 4:2:2 serial digital component signal, AES/EBU standard audio and analog audio. Each input has four channels.

• Audio level control

Each of the four audio channels of the BVW-D75 can be individually controlled for input level. A unique bargraph indicator is provided for precise level setting and this can be selected with an internal switch to have either VU or PEAK characteristics. Both recording and playback audio levels can be either preset or variable.

• Simple audio mixing

The BVW-D75 is equipped with a simple audio mixer operating on channel 1 and channel 2. These two channels can be mixed and the then mix switch selected for recording on either track 1 or track 2.

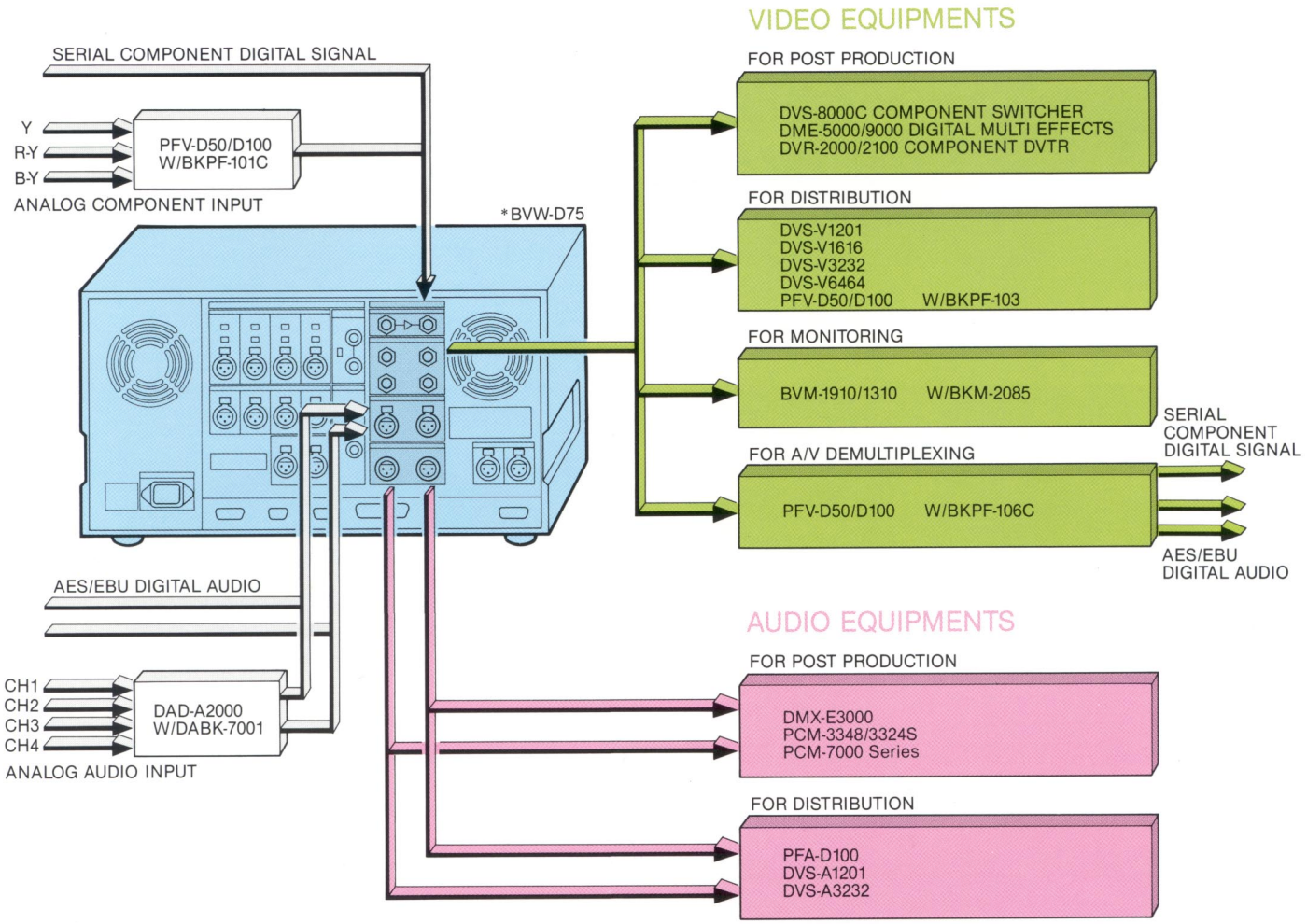
Improved Serviceability and Easy Maintenance

The BVW-D75 incorporates a comprehensive self-diagnostics function to assist servicing and maintenance. A digital hour meter is fitted to indicate parameters such as power on time, drum rotation time, tape running time and the number of threading/unthreading operations. In addition, its new loading mechanism makes the cleaning of both stationary heads and the drum remarkably easy.

Compact and lightweight

Compactness and light weight are key factors designed into the BVW-D75, which weighs approximately 30kg (66 lb 3 oz) and is 19-inch EIA standard rack mountable. The power consumption is 210W.

Typical Digital System Connections



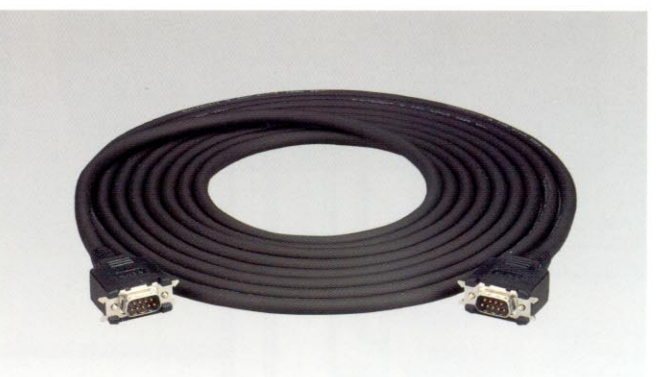
*Refer to the following rear picture of the BVW-D75.

Optional Accessories

Remote Control Unit
BVR-75A

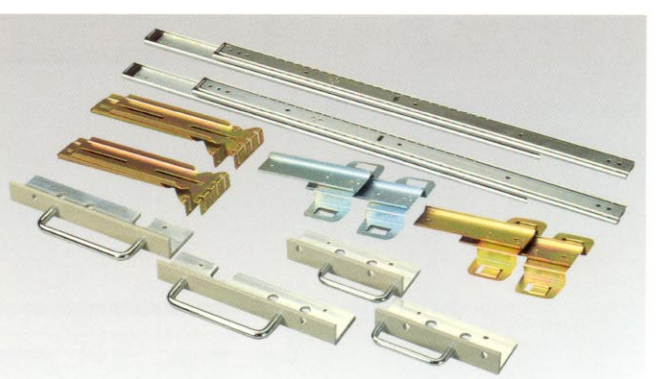
TBC Remote Controller
BVR-50

Digital Color Corrector
BVX-D10

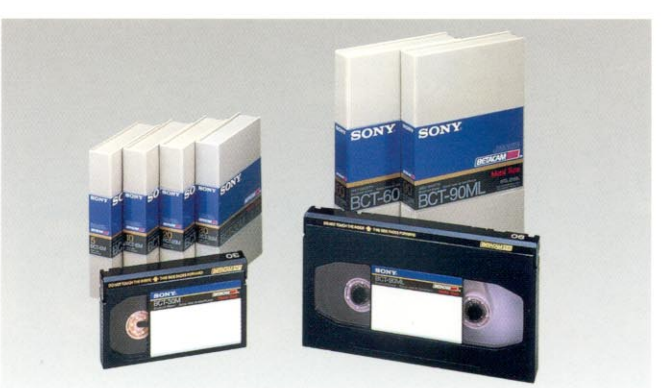


Remote Control Cable
RCC-5G/10G/30G
(5m) (10m) (30m)

Digital Audio Cable
(for AES/EBU interface)
ECD-3C/10C/30C
(3m) (10m) (30m)



Rack Mount Kit
RMM-100



Metal Particle Videocassette Tapes
BCT-5M/10M/20M/30M (Small Cassette)
BCT-5ML/10ML/20ML/30ML/60ML/90ML
(Large Cassette)

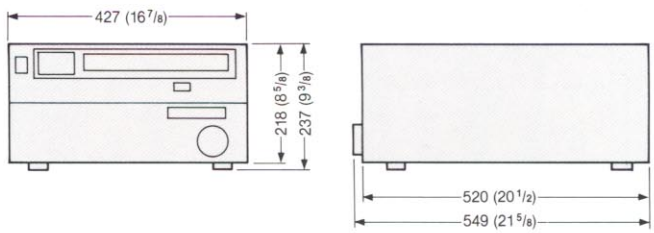
*The oxide tape variation is available in the same product range.

Specifications

General	
Power requirements	AC 90 to 265V, 48 to 64Hz
Power consumption	210 W
Operating temperature	5°C to 40°C (41°F to 104°F)
Storage temperature	−20°C to 60°C (−4°F to 140°F)
Humidity	Less than 80% (relative humidity)
Weight	30 kg (66 lb 3 oz)
Tape speed	11.86cm/s
Playback/recording time	More than 90 min (BCT-90ML) More than 30 min (BCT-30M)
Fast forward/rewind time	Less than 3 min with BCT-90ML
Search speed	
SHUTTLE	21 steps, STILL to 35 times normal speed, forward and reverse
VAR	54 steps, −1 to +3 times normal speed
JOG	Frame by frame, forward and reverse
Dynamic tracking range	−1 to +3 times normal speed
Lock up time	Less than 0.6 s from standby mode
Signal inputs	
REF VIDEO IN (BNC)	1.0Vp-p, 75 Ω
DIGITAL SERIAL V/A IN (BNC)	0.8Vp-p, 75 Ω (active loop through)
DIGITAL AUDIO IN CH-1/2, CH-3/4 (XLR 3-pin female × 2)	AES/EBU format, balanced
ANALOG AUDIO IN CH-1/2/3/4 (XLR 3-pin female × 4)	
LOW	−60dBm, 600 Ω/3k Ω selectable, balanced
HIGH	+4dBm, 600 Ω/10k Ω selectable, balanced
TIME CODE IN (XLR 3-pin female)	0.5V to 18Vp-p, 10k Ω, balanced
Signal outputs	
DIGITAL SERIAL V/A OUT (BNC × 4)	0.8Vp-p, 75 Ω
DIGITAL AUDIO OUT CH-1/2, CH-3/4 (XLR 3-pin male × 2)	AES/EBU format, balanced
ANALOG AUDIO OUT CH-1/2/3/4 (XLR 3-pin male × 4)	+4dBm (at 600 Ω load), low impedance, balanced
AUDIO SELECTED OUT CH1/2 or CH/3/4 (XLR 3-pin male × 2)	+4dBm (at 600 Ω load), low impedance, balanced
MONITOR OUT* (Y/R-Y/B-Y, BNC × 3)	Y: 1.0Vp-p, 75 Ω, sync negative R-Y/B-Y: 0.7Vp-p, 75 Ω 100/7.5/77/7.5 color bars When the CHARACTER switch on the system control panel is set to ON, Time Code, SETUP menu, VTR operation mode or error message can be superimposed on the signal.
TIME CODE OUT (XLR 3-pin male)	2.2Vp-p, balanced (at 600 Ω load)
Others	
REMOTE 1 IN	9-pin, female
REMOTE 1 OUT	9-pin, female
REMOTE 2	36-pin, female
TBC REMOTE	15-pin, male
KY REMOTE	15-pin, female (for a BVR-75A)
Processor adjustment range	
Video level	±3dB
Chroma level	±3dB
Set up level	0 to 15 IRE
System sync phase	−1 to +3 μs
Y/C delay	±100 ns
Supplied accessories	

Ac power cord (1)
Remote control cable RCC-5G (9-pin) (1)
Extension board (2)
Operation and maintenance manual (1)

Dimensions



Unit: mm (inch)

*Viewing purpose only. The performance of the monitor output shall not comply with the following video specifications.

Video Performance

	Metal Particle Tape	Oxide Tape
Bandwidth Luminance (50% modulation)	30Hz to 4.5MHz $^{+0}_{-3.5}$dB	30Hz to 4.1MHz $^{+0}_{-6.5}$dB
Color difference (50% modulation)	30Hz to 1.5MHz $^{+0}_{-3.5}$dB	30Hz to 1.5MHz $^{+0}_{-3.5}$dB
S/N ratio Luminance	More than 51dB	More than 48dB
Color difference	More than 49dB	More than 46dB
K-factor (2T pulse)	Less than 2%	Less than 3%
Y/C delay	Less than 20ns	Less than 20ns
L.F. non-linearity Luminance	Less than 3%	Less than 3%
Color difference	Less than 4%	Less than 4%

*All above video specifications were measured through the standard D/A converter

Audio Performance

	Metal Particle Tape	Oxide Tape
Longitudinal Frequency response (at 10dB below reference level)	40Hz to 15kHz $^{+1}_{-2.0}$dB	40Hz to 15kHz $^{+3}_{-3.0}$dB
S/N ratio (at 3% distortion level)	More than 72dB	More than 50dB (Dolby NR off)
Distortion T.H.D. (at 1kHz reference level)	Less than 1%	Less than 2%
Crosstalk (at 1kHz reference level)	Less than −65dB	—
Stereo phase (at 15kHz)	Less than 20°	—
Depth of erasure (at 1kHz) REC mode	More than 70dB	More than 70dB
INSERT mode	More than 65dB	More than 65dB
Wow and flutter	Less than 0.1% rms	Less than 0.1% rms
AFM Frequency response (at reference level)	20Hz to 20kHz $^{+0}_{-2.0}$dB	—
Dynamic range	More than 85dB	—
Distortion T.H.D. (at 1kHz reference level)	Less than 0.5%	—
Stereo phase (at 20kHz)	Less than 10°	—
Crosstalk (at 1kHz reference level)	Less than −70dB	—

*Reference level: +4dBm
*All above audio specifications were measured via the analog outputs.